METHOD AND DEVICE TO DISPLAY AN INDEX
OF TELETEXT PAGES

Field of the Invention

The present invention relates to the field of
teletext, and more particularly, to displaying an index
of teletext pages. Teletext is defined, for example,
5   in the European Telecommunications Standard (ETS)
300,706, dated May, 1997, which is incorporated herein
by reference.

Background of the Invention

Teletext is an ancillary service of
10 television channels designed to send written
information in addition to video information. This
written information is encoded in the form of digital
data packets, commonly called teletext packets, that
are broadcast at regular time intervals corresponding
15 to the frame return between two images. One to
eighteen teletext packets are thus broadcast about
every 20 ms.

A television screen displays a teletext page
of 25 lines, each with 40 characters. However, a
20 teletext page is defined in practice by more than 32
teletext packets numbered X0 to X31, the contents of

which are defined by the ETS standard. For each page, the following packets are transmitted. A packet X0 called a header packet that contains information especially on the number of the page to which it

5 pertains is transmitted. At most 25 packets X1 to X25 called normal packets containing the characters to be displayed on the television screen with each packet corresponding to a line to be displayed are transmitted. In addition, packets known as non-

10 displayable packets, X26, X27, X28, X29, X30 or X31, containing inter alias information for the shaping of the characters to be displayed and information on links towards other teletext pages are transmitted.

A full teletext program of a television

15 channel comprises, for example, 500 pages that are associated, as the case may be, to form logic sets known as magazines. Each magazine comprising a variable number of teletext pages. For example, the television station may propose four magazines whose

20 themes are, respectively, sports, finance, international news and weather. The total time to broadcast a teletext program is about 40 seconds and all the teletext pages are broadcast in cycles. In other words, one page is broadcast approximately every

25 40 seconds. This enables the television station to very regularly update the information content of its pages or to create animation effects.

To display a desired page, a teletext decoder of a television receiver first seeks the desired page

30 by decoding the page number associated with each packet X0 received. Then the decoder copies all the packets of the desired page in a display memory. This display memory is read permanently by display means of the

screen of the television set to display its contents on the screen.

Most usually, when the teletext service of a television channel is transmitted, the decoder
5 automatically searches for page 100 and, as soon as it is received, displays it automatically. This page is, for example, an introduction page of the program. The page 100 shows the different magazines as well as the numbers of the first page of each magazine. To access
10 a particular magazine, the user then keys the page number associated with the first page of the magazine desired into a remote control device or a keypad.

The user can also access a special page of a magazine by keying in the corresponding number of the
15 desired page. This is of course possible only if the user knows the number of the desired page. The contents of a page having a given number is likely to change between two broadcasts of the same program. Furthermore, one page number may correspond to
20 different magazines from one television channel to another. It is therefore not always easy for the user to retrieve the number of a page dealing with a desired subject.

There are existing navigation systems used to
25 access a page dealing with a desired subject, without it being necessary to have any knowledge of the corresponding page number. A first navigation system is the FLOF system commonly used in France, England and Spain. The FLOF system is based on a color choice
30 system. At the bottom of each page, the 24th line displayed on the screen has several labels, each corresponding to a link towards another page of the

program. The 24th line displayed corresponds to the broadcast packet X24.

A label is a string of characters comprising eventually one or more words by which the user can
5 identify the contents of the corresponding page. A label may also contain the number of the corresponding page, encoded in decimal form so that it can be understood by the user. The FLOF system associates a color code with each label. This color code
10 corresponds, for example, to the background color on which the label is displayed.

To request the display of one of the pages whose label is displayed at the bottom of the page being displayed, the user simply chooses the color code
15 associated with the chosen label. This choice is made, for example, by the remote control or the control keypad associated with the television set which, in this case, has colored buttons.

Then, in the control packet X27 of the page
20 being displayed, the decoder will read the page number associated with the chosen label. The packet X27 indeed contains the page numbers associated with each label of the corresponding packet X24 of the page being displayed. These page numbers are encoded in the form
25 of binary numbers. The desired page is finally loaded, namely searched for and copied into the display memory by the decoder and then displayed on the screen.

The FLOF navigation system is practical because it requires no knowledge of page numbers to
30 display and consult a desired page. However, the number of links or labels displayed on one page is limited to six and, most usually, only four are used.

It is therefore sometimes necessary to display several unwanted pages before displaying a desired page.

For example, if a user wishes to consult a page about the Paris stock exchange, he may have to first display the first page of the finance magazine, and then the first page of a section on the different international stock exchanges before he can finally display the desired page that concerns the Paris stock exchange. In certain cases, it may be necessary to display up to ten pages before obtaining the desired page. This means that a relatively lengthy time is needed to access certain pages.

A navigation system such as the FLOF system is also a closed system because the contents of the packets X24 and X27 associated with each teletext page of the program correspond to choices made by the supplier of the service. The user cannot choose his own links according to his own requirements.

A second navigation system is the table of pages (TOP) system, which is commonly used in German-speaking countries. With each set of pages or each program, a supplement is transmitted that includes non-displayable packets pertaining to the hierarchical ordering of the pages. These packets contain a definition of the links associated with each page. These packets are stored at each reception of a program.

With a system of this kind, this hierarchical ordering is done at three levels. Each magazine is divided into a set of a variable number of sections, with each section being divided into a variable number of pages. When a desired page is being displayed, the decoder displays, for example, at the bottom of the

page on the 24th line, the labels "previous page",
"next page", "next section", and "next magazine". When
the user has made his choice of a colored button
associated with the different labels or else by the
5 controlled buttons for moving and selecting a label,
the decoder associates the choice made with a
corresponding page number contained in the hierarchical
ordering packets.

Finally, the decoder searches for the desired
10 page and stores it, as soon as it is received, in the
display memory. With a navigation system like the TOP
system, the user can thus go more easily from one page
to the next one or from one section to the next one.
However, if the user is interested only in a first
15 section and a third section, he still has to request
the display of the second section before accessing the
third one.

Thus, present-day navigation systems for
teletext services are easy to use because it is not
20 necessary to know the number of a desired page to gain
access to it. However, their use most commonly
requires fairly lengthy periods of time to access the
desired information. It is often necessary to load and
display several pages before obtaining a desired page.

25 To limit the time taken to load a teletext
page, it is possible to use a decoder with a buffer
memory whose size is sufficient to store several
teletext pages, even all the pages of a program
broadcast by a television channel. This is especially
30 the case with high-end television sets. In this case,
when the teletext service is transmitted, the decoder
first stores all or part of the program and then
displays the introduction page. When a desired page

has to be displayed, it is simply copied from the
buffer memory into the display memory. This is a fast
process.

5   In parallel, the contents of the buffer
memory are refreshed continuously as the teletext pages
are received. The display of a desired page is
immediate because it is no longer necessary to wait for
the reception of this desired page to be able to
display it. However, if the television set is used

10 with a TOP navigation system or a FLOF system, the user
will nevertheless have to possibly display several
pages on the screen before reaching the desired page.
This is annoying to the user and unnecessary.

Summary of the Invention

15   In view of the foregoing background, it is
therefore an object of the present invention to
implement a method and an associated device wherein the
user can obtain easy and fast access to a desired
teletext page by eliminating the need to display

20 intermediate unwanted pages.

Another object of the invention is to
implement a method and an associated device that can be
used to give the user a fast, complete view of the
entire teletext program of a television channel.

25   These and other objects, advantages and
feature are provided by a method for displaying the
index of a teletext program on a television receiver
screen, wherein the teletext program comprises several
teletext pages. Each teletext page may be broadcast in

30 the form of a set of data packets.

More particularly, the method comprises the
step of receiving a teletext page wherein the set of

data packets includes a first data packet comprising at least one label referring to another teletext page, and a second data packet associated with the first data packet and comprising a page number associated with at
5   least one label. The first and second data packets are decoded to obtain at least one label and its associated page number, and the at least one label and its associated page number are stored in a buffer memory.

        The first data packet of the teletext page
10   received can also comprise several labels, with each label referring to another teletext page. In this case the second packet of the teletext page received comprises a page number associated with each label of the first packet. The several labels and associated
15   page numbers are stored during the storage step.

        Preferably, the steps of reception, decoding and storage are performed in cycles at each reception of a teletext page of the program to update the contents of the buffer memory. According to one
20   embodiment, the method may also comprise the step of displaying an index of the teletext program from the contents of the buffer memory. This may be performed at the user's request. The step for displaying the index preferably comprises the steps of reading in a
25   buffer memory the labels and associated page numbers, and creating the index comprising one or more pages each including a list of labels and associated page numbers.

        The invention uses information extracted from
30   the first and second data packets already used to create one or more index pages listing the entire teletext program. With the invention, the user at any time can easily search for a desired teletext page and

immediately obtain its number. He can also make a
quick selection in the index by using shifting and
selection buttons on a control keypad, for example, of
the label of a desired teletext page to request its
5 display. With the invention, the display of the
desired page is fast because it is no longer necessary
to request the display of intermediate teletext pages
to access the desired teletext page.

The invention is easier to implement inasmuch
10 as the first and second data packets are already
broadcast routinely for each teletext page. The
invention thus uses an already present information
element to provide a more user-friendly navigation
system that is simpler to use than the known navigation
15 systems.

More particularly, a television signal
receiver device comprises a reception antenna to
receive pages of a teletext service. The antenna is
coupled to a demodulator by a television signal
20 receiver. A teletext decoder is coupled to the
demodulator and includes a display memory therein. A
screen is used to read and display the contents of the
display memory.

According to the invention, the teletext
25 decoder also comprises means to implement a method for
the display of a previously described index, with the
means comprising at least one buffer memory. According
to one embodiment, the means of implementing the method
comprises a set of logic gates. According to another
30 embodiment, the means of implementing the method
comprises software that includes a set of instructions
stored in a memory of the decoder.

Brief Description of the Drawings

The invention will be understood more clearly and other characteristics and advantages shall appear from the following description of an exemplary method
5 of displaying an index of a teletext program according to the invention, the description of which refers to the appended figures, of which:

Figure 1 illustrates flow charts for the implementation of displaying a teletext program index
10 according to the present invention; and

Figure 2 is a block diagram of a device for implementing the display method according to the present invention.

Detailed Description of the Preferred Embodiments

15 Referring now to Figures 1 and 2, the method of the invention is used to build a full index of a received teletext program when a user of the teletext service asks for it. The pieces of information needed to display the index are regularly updated in parallel
20 throughout the period of use of the teletext service. It is furthermore assumed in the illustrated example that a television channel proposing the teletext program broadcasts a number N = 20 of teletext pages and that the full index comprises a single page, i.e.,
25 it can be displayed in one take on the screen. The full program (the N pages) is broadcast by the channel continuously and in cycles throughout the period of use of the service.

In the example, the method of the invention
30 is implemented in a television signal receiver comprising a screen 30, an antenna 31 coupled to a decoder 32 via a receiver 33 and a television signal

demodulator 34. The decoder 32 comprises a display
memory 41 that is permanently read by the screen 30.
The decoder 32 also implements the method of the
invention which will be described in greater detail
5 below.

In the example, the method of displaying
according to the invention comprises, according to
Figure 1, a first step 10 for the acquisition of the
data needed to make an index, and a second step 20 to
10 display the index. The first step 10 is performed
continuously for each teletext page broadcast and
throughout the period of operation of the teletext
service. On the contrary, the second step 20 for the
display of the index is executed at the request by the
15 user of the service.

The first step 10 has substeps including
reception (step 12), decoding (step 14) and storage
(step 16) of the information needed to make the index.
During the step 12, a decoder of a television receiver
20 receives the data packets of a teletext page,
especially the packets X24 and X27.

As explained above, the packet X24 of a
teletext page contains a set of labels, usually less
than four and possibly zero. The labels represent the
25 links to other pages of the teletext program. The
associated packet X27 for its part contains the page
numbers associated with each label of the corresponding
packet X24 encoded in the form of binary numbers. A
label is a string of characters comprising one or more
30 words by which the user can identify the contents of
the corresponding page. Advantageously, a label also
comprises a word indicating the number of the
corresponding page in decimal form. For example, a

label such as "SPORT: 150" informs the user that the
sports magazine begins at page 150 of the program.

During the step 14, the decoder decodes the
packets X24 and X27 to associate, with each label of
5 the packet X24, the corresponding page number contained
in the packet X27. In the step 16, the label/page-
number pairs obtained at the end of the step 14, if
there are any, are stored in a buffer memory.
Naturally, if a previous value of a label/page-number
10 pair is already stored in the buffer memory, then this
previous value is erased and replaced by the new value.

The label/page-number pairs are, for example,
stored in alphabetical order of the labels. This
straightforward approach prevents redundancy and the
15 unnecessary storage of the same label/page-number pair
at two different points of the buffer memory. This is
a non-negligible risk because the same label may be
contained in several packets X24. Other approaches may
naturally be planned. For example, the label/page-
20 number pairs may be classified by an increasing order
of page numbers. This classification is, however, less
valuable because two different labels may refer to the
same page and it possible that information might be
lost.

25 At the end of step 16, a new step 10 is
performed. The step 10 is thus performed continuously
throughout the period of use of the teletext service.
The contents of the buffer memory can thus be updated.
The second step 20 for displaying the index is
30 performed in parallel with the first step 10 and at the
user's request. In the example of Figure 1, the step
20 has four substeps, which are for the reading (step

22) and sorting (step 24) of the labels, creation (step
26) and storage (step 28) of the index.

During the step 22, the labels are read in
the buffer memory. During the step 24, the labels and
5   associated numbers are sorted and classified, for
example, in an alphabetical order of the labels. They
may also be classified by theme, by the grouping of
labels that comprise a common part which includes a
string of characters. Other types of sorting may be
10   used. What is essential is that all the labels should
be listed, preferably in the manner most easily
comprehensible to the user. The sorting step 24 is not
indispensable and may be eliminated as the case may be.
This step simply seeks to facilitate the future use of
15   the index.

The step of creating the index 26 includes
the creation of a menu which, just like a page of the
teletext program, may comprise a packet X0, at most 23
packets X1 to X23 and possibly packets X24 to X31. A
20   menu is a set of written information elements generated
by the teletext decoder and not broadcast by a
television channel. A menu may also be stored in a
memory of the decoder and/or be displayed on the
screen. A menu may contain several pages if its
25   contents are too great to be displayed in a single time
on the screen. Menus other than the index menu exist
and are known. For example, a menu containing advice
on adjusting the sound and image of the receiver may be
displayed on the screen when the teletext decoder is
30   powered on.

The packets X0 to X31 of the index menu are
defined as follows. The packet X0 is a header packet
comprising information on the contents of the following

packets X1 to X31. For example, this information is in
the form of a string of index characters and a page
number different from the numbers of the teletext pages
of the program.

5   The packets X1 to X23 of the index menu,
called normal packets, contain the labels previously
stored in the buffer memory that form the information
content of the index. Each normal packet comprises the
set of characters to be displayed on the same line of
10 the screen. Thus, depending on the size of the labels,
i.e., the number of characters that form them, the same
packet may comprise one or more labels or simply a part
of the labels. For a program comprising N = 20
teletext pages, it is possible to create 20 packets X2
15 to X21 each comprising a label, for example.

        The packets X24, X25, X26, X27, X28, X29, X30
or X31 contain information on the shaping of the
contents of the normal packets of the index menu when
they are displayed and possible information on links to
20 other teletext pages of the program. These packets are
not indispensable to making the index and it may be
that they will not be created. During the performance
of the step 28, the set of packets X0 to X31 of the
index menu created is then stored in the display memory
25 which is read permanently by the display means of the
screen of the television set to display its contents on
the screen.

        In the above example of a teletext program
comprising N = 20 pages, the set of labels of the
30 program is stored in only 20 packets of data to be
displayed, X2 to X21, and the method gives an index
menu containing only one page. Furthermore, each label
displayed in the index comprises the number (in decimal

base) of the corresponding page. In this case, to use
the displayed index and request the display of a
desired teletext page of the program, the user simply
identifies the page number contained in the label of
5 the chosen teletext page.

　　　　One variation of the method of Figure 1 is
especially valuable for programs comprising a large
number of teletext pages, such as N = 100 pages for
example, and for which it is necessary to create an
10 index menu containing several pages to list all the
labels of all the teletext pages of the program. For
this variation, the steps 26 and 28 are modified as
follows.

　　　　During the performance of the step 26, an
15 index of several pages is created. As many index pages
are created as are needed to list all the labels
contained in the buffer memory and stored in the course
of successive performances of the step 16. For
example, for a program of 100 teletext pages, it is
20 possible to create five index pages, each page
containing 20 labels indicating the subject processed
in 20 different teletext pages. Each index page
created essentially comprises a teletext page at the
broadcast program, a packet X0, at most 23 packets X1
25 to X23, and possibly the packets X24 to X31 defined as
follows.

　　　　The header packet X0 comprises an indication
of the contents of the page and a page number.
Naturally, two different index pages may comprise
30 different page numbers. The packets X1 to X23 comprise
labels contained in the buffer memory and classified,
as the case may be, by alphabetical order or by theme.
The packet X24 comprises labels of the "next page"

and/or "previous page" type. The labels may also
contain the number in a form readable by the user of
the corresponding index pages to enable the user to
have easy access to all the pages of the index menu.

5   The packet X27, if it exists, contains page
numbers of the index menu associated with the labels of
the packet X24 and is encoded in the form of binary
numbers. Finally, the packets X25, X26, X28, X29, X30
or X31, if they exist, contain information on the
10   shaping of the contents of the packets X1 to X23 during
their display on the screen.

         During the performance of the step 28, all
the pages created during the performance of the
previous step 26 are then stored in a second buffer
15   memory. Then a page, preferably the first page of the
index menu is copied from the second buffer memory to
the display memory to immediately display the beginning
of the index.

         It must be noted that the first and second
20   buffer memories used to store the label/page-number
pairs during the step 16, and the full index during the
step 28 may be replaced by a single buffer memory
comprising a first zone to store the contents of the
packets X24 and X27 of the pages of the program and a
25   second zone to store the created index.

         It must also be noted that it is not
indispensable to create packets X27 associated with the
packets X24 for the index pages if the page numbers are
already registered in the labels contained in the
30   packets X24, and therefore displayed on the screen.
Indeed, in this case the user may request the display
of a desired index page by directly keying the number
of the desired index page into the control keypad or

remote control unit of the receiver. However, the
addition of packets X27 makes it easier to use the
index and enables the consultation of all the pages of
the index, and possibly the choice of a page, by using
5   shift and selection keys or colored buttons, for
example.

It must be noted finally that the method and
device described above with reference to Figures 1 and
2 are only non-restrictive examples of implementation
10 of the invention. In particular, all the numerical
values are given simply by way of an indication and,
obviously, they may be modified.

In another variation of the method of the
invention, the steps 10 and 20 comprise testing sub-
15 steps 15 and 21, which are shown as dashed lines in
Figure 1. During the performance of the step 15, it is
determined that a step 22 for the reading of the buffer
memory is in progress. If the test is negative, the
buffer memory is freely accessible and the storage step
20 16 is performed. On the contrary, if a step 22 is in
progress, then a new testing step 15 is performed.

In the same way, during the performance of
the step 21, a verification is made to find out if a
label-storage step 16 is in progress or not. If the
25 test is negative, the buffer memory is freely
accessible and the reading step 22 is performed. On
the contrary, if a step 16 is in progress, then a new
test step 21 is performed. This variation is
particularly valuable in the fairly frequent case where
30 the buffer memory cannot be used both in reading and in
writing. The addition of the test steps 15 and 21 then
prevents any conflicts of access.

The method of the invention, an example of
which has been described above, is implemented by the
decoder of a television signal receiver of the kind
shown in Figure 2 by means provided for this purpose,
5   namely means to create and display one or more index
pages on the screen from a set of teletext pages
transmitted to the receiver in the form of digital data
packets.

This means comprises a first buffer memory to
10   store the labels and page numbers during the
performance of the step 16 and, if necessary, a second
buffer memory to store pages of the index during the
performance of the storage step 28. Naturally, the
first and second memories may be replaced by two
15   distinct zones of the same memory. According to a
preferred embodiment, the means furthermore comprises
software means that includes a set of instructions
stored in a memory of the decoder designed for this
purpose. According to another embodiment, the means
20   comprises a set of logic gates and circuits.